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NEEDLESTICK INJURIES

A Summary of the Occupational Health Concern

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NEEDLESTICK INJURIES--A SUMMARY OF THE OCCUPATIONAL HEALTH CONCERN

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risk of needlestick injury.

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GOVT COURT

1. INTRODUCTION

Needlestick injuries are a hazard for people who work with hypodermic syringes and other needle equipment. These injuries can occur at any time when people use, disassemble, or dispose of needles. When not disposed of properly, needles can become concealed in linen or garbage and injure other workers who encounter them unexpectedly.

Needlestick injuries transmit infectious diseases, especially blood-borne viruses. In recent years, concern about hepatitis B and AIDS (Acquired Immune Deficiency Syndrome) has prompted research to find out why these injuries occur and to develop measures to prevent them. Many studies disagree about the factors that cause accidents with needles. Despite published guidelines and training programs, needlestick injuries remain an ongoing problem.

To develop effective prevention programs, health and safety committees should be aware of current information on needlestick injuries. It is also important to appreciate the need for further investigation to understand the factors that lead to accidents with needles.

2. WHAT ARE NEEDLESTICK INJURIES?

Needlestick injuries are wounds caused by needles that accidentally puncture the skin.

These are a serious occupational hazard for people who:

- work with needle equipment while treating patients or carrying out laboratory procedures
- do not work directly with needles but become injured by needles which have not been disposed of properly

3. WHAT ARE THE HAZARDS OF NEEDLESTICK INJURIES?

Accidental punctures by contaminated needles can inject hazardous fluids into the body through the skin. There is potential for injection of hazardous drugs, but injection of infectious fluids, especially blood, is by far the greatest concern. Even small amounts of infectious fluid can spread certain diseases effectively.

Major Concerns

Accidental injection of blood-borne viruses is the major hazard of needlestick injuries, especially the viruses that cause hepatitis B, hepatitis non-A, non-B and AIDS (the HIV virus).

Hepatitis B

Researchers estimate that 12,000 health care workers occupationally acquire hepatitis B each year in the United States, mostly from needlestick injuries. Of these workers, 250 to 300 die each year directly or indirectly because of this disease.

Injuries from needles contaminated with infected blood spread the hepatitis B virus in 25 to 30 percent of cases. Post-exposure treatment with hepatitis B immunoglobulin greatly reduces this risk. Vaccines to protect against hepatitis B are also available for workers at risk before they have contact with the virus.

Hepatitis non-A, non-B

Needlestick injuries may also transmit hepatitis non-A, non-B. This disease resembles hepatitis B, but it is caused by a different blood-borne virus (or viruses).

AIDS

The risk of needlestick transmission of HIV, the virus that causes AIDS, is considerably less than for hepatitis B virus. Several hundred health care workers have been accidentally exposed, mostly through needlestick injuries, to blood from patients infected with the HIV virus. As of May 1989, researchers report that needlestick injuries transmitted HIV to four of these health care workers in the United States. Two cases involved deep injections with blood-contaminated needles. Others involved superficial injuries with needles contaminated with body fluids or blood. Researchers estimate that needlestick injuries involving blood-contaminated with HIV can spread the virus in 0.5 percent of cases.

In Canada, the Federal Centre for AIDS maintains a national surveillance program to monitor occupational exposure to HIV-infected blood and body fluids. As of October 1988, none of the 205 exposed health care workers whom the Centre examined have developed any signs indicating HIV transmission.

Other Concerns

Needlestick injuries have transmitted at least eighteen other diseases involving viruses, bacteria, fungi, and other microorganisms to health care workers, laboratory researchers, and veterinarian staff.

The diseases include:

- blastomycosis
- brucellosis
- cryptococcosis
- diphtheria
- enbola fever
- cutaneous gonorrhoea
- herpes
- leptospirosis
- malaria
- mycobacteriosis
- mycoplasma caviae
- Rocky Mountain spotted fever
- sporotrichosis
- staphylococcus aureus
- streptococcus pyogenes
- syphilis
- toxoplasmosis
- tuberculosis

Many of these diseases were transmitted in rare, isolated events. They still demonstrate, however, that needlestick injuries can have serious consequences.

4. WHAT WORKERS ARE AT RISK?

Needlestick injuries are an occupational hazard for all people who work with needles. The risk of blood-borne viruses is highest for certain groups of health care workers:

- nursing and laboratory staff who use, disassemble, or dispose of needle equipment

- domestic and portering staff who encounter needles disposed of in regular trash or lost in linen at the bedside

Other occupational groups at risk of blood-borne viruses include medical staff, radiology staff, dentists and dental staff, funeral directors and embalmers, and workers who remove garbage. Workers who repair automated blood-testing equipment are also at risk.

Groups at risk of acquiring other infectious diseases from needlestick injuries include veterinarians and associated staff, and laboratory workers, especially those who work with animals.

5. HOW COMMON ARE NEEDLESTICK INJURIES?

Needlestick injuries are a far too common hazard. Some hospitals report one third of nursing and laboratory staff suffer such injuries each year.

Available statistics probably underestimate the severity of the problem because 40 to 60 percent of workers do not report their injuries. This makes it difficult to know exactly how serious the problem is or how well prevention programs work.

6. HOW DO NEEDLESTICK INJURIES OCCUR?

A needlestick injury is the result of an accident with a needle. Several studies show that needles cause injuries at every stage of their use, disassembly, or disposal. But there is disagreement as to why the accidents are so common among health care workers or why simple solutions fail to solve the problem. The articles by Jagger, listed on page 10, call attention to many of the complex factors that can lead to accidents with needles.

The causes of needlestick injuries vary according to different situations. The most critical situations involve clinical procedures, recapping, and disposal.

Clinical Procedures

Nursing and laboratory staff usually experience 30 to 50 percent of all injuries during clinical procedures. Equipment design, nature of the procedure, condition of work, and staff experience have all been mentioned as factors that influence this occurrence.

Equipment Design

At present, there is very little information on the relation between needlestick injuries and the design of needle equipment. Only one study by Jagger in 1988 has examined this aspect in detail. In this case, the risk of injury was estimated in terms of the total number of purchased instruments. The table below summarizes these results.

Table - Needlestick injuries and needle equipment

Type of Needle Equipment	Percent Total Injuries	Injuries per 100,000 Items Purchased
Disposable syringes	5	7
Intravenous tubing, needle assemblies	26	37
Pre-filled cartridge syringes	12	8
Winged steel-needle intravenous sets	7	18
Vacuum-tube phlebotomy assemblies	5	25
Intravenous catheter stylets	2	18

Equipment requiring disassembly after use caused the highest rate of injury. Injuries occurred when staff recapped needles or when they disposed of equipment such as intravenous assemblies with needles exposed.

Nature of Procedure

Critical situations during clinical procedures include:

- withdrawing a needle from a patient, especially if staff attend to bleeding patients while disposing of the needle
- having the device jarred by a patient
- pulling a needle out of the rubber stopper of a vacuum tube which can jab the hand in a rebound reflex

Injuries commonly occur when workers try to do several things at the same time, especially while disassembling or disposing of needles.

Conditions of Work

Work conditions that might contribute to an increase in the number of needlestick injuries include:

- staff reductions where nurses, laboratory personnel and students assume additional duties
- difficult patient care situations
- working at night with reduced lighting

Staff Experience

New staff or students tend to have more needlestick injuries than experienced staff.

Recapping

Recapping can account for 25 to 30 percent of all needlestick injuries of nursing and laboratory staff. Often, it is the single most common cause.

It is extremely dangerous to hold a needle in one hand and attempt to cover it with a small cap held in the other hand. Injuries occur three different ways:

- the needle misses the cap and accidentally enters the hand holding it
- the needle pierces the cap and enters the hand holding it
- the poorly fitting cap slips off of a recapped needle and the needle stabs the hand

Several agencies have recommended that workers avoid recapping needles before disassembly or disposal. Despite this, some health care workers have continued the practice even when informed of the dangers. In some cases, inappropriate training or force of habit may be responsible. In a recent study, however, workers gave the following reasons for recapping despite knowing about the potential hazards:

- to protect themselves when disassembling a non-disposable needle device with an exposed contaminated needle
- to protect themselves from exposed needles when several items were carried to a disposal box in a single trip
- to store a syringe safely between uses if its contents were to be administered in two or more doses at different times
- to protect other people in crowded conditions on the way to the disposal box

Guidelines from the Laboratory Centre for Disease Control recommend that workers do not recap (or bend or cut) needles but dispose of them directly into puncture-proof containers. A further report of a Consensus Committee Meeting (listed on page 10), states that devices are available for safely recapping needles in situations where recapping is considered necessary.

Disposal

Needlestick injuries commonly occur when workers dispose of needles. They occur when staff use special containers for needles and sharps. They also occur when needles are disposed of improperly in regular garbage or lost in the workplace.

Special Containers

Up to 30 percent of needlestick injuries of nursing and laboratory staff occur when workers attempt to dispose of needles using sharps containers. Accidents occur at every step:

- while carrying the needle to the disposal container, especially when the needle is uncapped and mixed with other trash
- while placing the needle into the disposal container, especially if the container is overfilled
- while emptying disposal containers instead of sealing them for disposal

Improper Disposal

Virtually all needlestick injuries of domestic and portering staff are from needles that have either been lost in the workplace or thrown into regular garbage. Most investigators find it difficult to understand why this situation occurs. Some attribute the problem to forgetfulness or lack of motivation or training on the part of people who work with needles. Others feel that inconvenient disposal systems contribute to these incidents.

7. HOW CAN NEEDLESTICK INJURIES BE PREVENTED?

Preventing needlestick injuries is the most effective way to protect workers from the infectious diseases that needlestick accidents transmit. A comprehensive needlestick injury prevention program would include:

- employee training
- recommended guidelines
- safe recapping procedures
- effective disposal systems
- surveillance programs
- improved equipment design

Employee Training

To reduce needlestick injuries, an effective program must include employee training. Workers need to know how to properly use, assemble, disassemble, and dispose of needles. Workers need to understand the risks associated with needlestick injuries and know the proper means to prevent them. Specifically, the training programs should address:

- risk of injury
- potential hazards
- recommended precautions for use and disposal of needles
- procedures for reporting injuries
- the importance of hepatitis B vaccination where appropriate

Recommended Guidelines

The Laboratory Centre for Disease Control's Bureau of Communicable Disease Epidemiology reviews, publishes, and updates guidelines to protect staff from exposure to all blood-borne disease-causing agents.

The following guidelines deal specifically with needle safety:

- Needles, scalpel blades and other sharp instruments--workers should consider these as potentially infectious and handle them with care to prevent accidental injuries.

- Disposable needles and syringes, scalpel blades, and other sharp items--workers should place these in puncture-resistant containers located near the area of use. They should avoid overfilling the containers because accidental needlestick injuries may occur.

- Recapping--Workers should not recap needles by hand or purposely bend, break, or remove them from disposable syringes or otherwise manipulate them by hand.

Safe Recapping Procedures

In situations where recapping is considered necessary, develop safe approaches which workers can follow. Workers should never move an exposed needle tip towards an unprotected hand.

Single-handed Scooping

Recapping can be safe when people lay the cap on a flat surface and scoop it onto the tip of a syringe held in one hand. They must keep the free hand away from the sheath and well behind the exposed needle.

Recapping Devices

Several devices are available for recapping needles safely. Some devices permit single-handed recapping by parking a needle cap on a flat surface. Other devices are designed to protect the hand that holds the cap during two-handed recapping procedures. As yet, most products have not received independent testing and the two-handed recapping process remains a cause for concern. Recapping devices require further investigation. They may provide a practical solution for situations where recapping is considered necessary.

Disposal

An effective system for disposing of used needles is crucial to preventing needlestick injuries. Having disposal containers readily available can greatly reduce the concern for recapping needles.

Workers should place needles in wide-mouth, puncture-proof containers. Locate disposal containers specifically where needles are used to make safe disposal possible without recapping. Replace the containers before they are completely filled. Make sure they are sealed, collected, and disposed of in accordance with local regulations for biomedical waste.

All staff should report every incident in which they find needles left at the bedside or thrown into the regular garbage.

Several agencies have developed specific guidelines for the disposal of needles and sharps in health care facilities. These include the Canadian Standards Association, the Health Care Occupational Health and Safety Association, and the Ontario Ministry of Labour (see Further Reading section).

Surveillance

There is still a serious lack of information about the various factors that cause accidents with needles. Surveillance programs that provide in-depth analysis of needlestick accidents are an important tool for obtaining this information. The goals of these programs should include:

- determining the rate of needlestick injuries
- investigating the factors that cause the injuries
- ensuring that injured workers receive proper treatment
- identifying areas in which the prevention program needs improvement
- eventually providing practical strategies for dealing with the problem

Several agencies have prepared specific forms to help health care facilities collect comprehensive information about incidents of needlestick injuries. The publication by the Health Care Occupational Health and Safety Association, listed on page 10, provides examples of such forms.

The Federal Centre for AIDS maintains a surveillance program to monitor occupational exposure to HIV-infected blood and body fluids among health care workers.

Continued Innovation

There is a need for further investigation and innovation to develop means for preventing needlestick injuries. These investigations should aim:

- to identify the types and designs of needle instruments that are potentially capable of causing needlestick injuries
- to understand better how needle devices are normally handled in the workplace and how they cause injuries
- to find methods that eliminate the need to move hands towards the tips of contaminated needles, or to manually disassemble contaminated needle equipment

8. SUMMARY

Needlestick injuries are a hazard for people who work with needle equipment. Effective prevention requires awareness of the hazards and information about factors that cause accidents with needle equipment in the workplace. For further information, consult the attached list of articles or contact the Inquiries Service of the Canadian Centre for Occupational Health and Safety.

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